

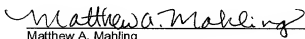
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application)	<u>PATENT APPLICATION</u>
Inventors: Stephen P. DeOrnellas, et al.)	
Appl. No.: Unknown)	
Confirm No.: Unassigned)	
Filed: Herewith)	
Title: METHOD FOR MINIMIZING THE CRITICAL DIMENSION GROWTH OF A FEATURE ON A SEMICONDUCTOR WAFER)	<u>Customer No. 23910</u>

CERTIFICATE OF MAILING BY "EXPRESS MAIL" UNDER 37 C.F.R. §1.10

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 (Signature)
Matthew A. Mahling
Signature Date: June 13, 2001

PRELIMINARY AMENDMENT

Box PATENT APPLICATION
Commissioner for Patents
Washington, DC 20231

Dear Sir:

Before calculating the filing fee, please amend the subject application as follows.

In the Specification:

Prior to the first line of the specification, delete any amendatory material and insert --This application is a Continuation of Serial No. 09/505,420, filed February 16, 2000, which is a Divisional of Serial No. 08/974,089, filed November 19, 1997, now U.S. Patent No. 6,046,116.--

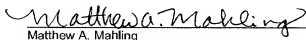
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In the Claims:

Cancel claim 1.

Add new claims 39-64, as set forth in the claim set below.

1 39. A method for minimizing critical dimension growth of a feature located on a
2 wafer during an etch process including the steps of:
3 placing a wafer on a chuck in an etch reactor;
4 etching a wafer in an etch reactor; and
5 controlling the amount of heat transferred from the wafer in order to allow the
6 temperature of the wafer to climb to the range of about 130°C to about 300°C, thereby
minimizing the critical dimension growth of the feature located on the wafer.

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1 44. The method of claim 39 wherein the controlling step further includes:
2 using a heat source incorporated with the chuck to heat the wafer.

1 45. The method of claim 39 wherein the controlling step includes:
2 allowing the temperature of the wafer to rise to the range of about 130°C to about
3 300°C in the range of about 60 seconds to about 240 seconds.

1 46. The method of claim 43 wherein :
2 the adjusting step includes setting the pressure of the gas in the range of about zero
3 torr to about 10 torr.

1 47. The method of claim 43 wherein:
2 the adjusting step includes setting the pressure of the gas at about 1 torr.

1 48. The method of claim 39 wherein the controlling step includes:
2 allowing the wafer temperature to rise from about 225°C to about 250°C during the
3 period of about 60 seconds to about 150 seconds from the beginning of etch in order to cause
4 critical dimension growth to plateau.

1 49. The method of claim 39 wherein the etching is carried out in a low pressure
2 etch reactor which operates in the millitorr range and wherein a gas is contained in contact with
3 the chuck, which gas is in the range of about 0 torr to about 10 torr and is preferably about 1 torr.

1 50. A method for minimizing critical dimension growth of a feature located on a
2 wafer during an etch process including the steps of:
3 placing a wafer on a chuck in an etch reactor;

controlling the temperature of the wafer by controlling the amount of heat transferred from the wafer;
etching a wafer in an etch reactor; and
allowing the temperature of the wafer to climb in order to minimize the critical dimension growth of the feature located on the wafer by reducing the amount of heat transferred from the wafer.

51. The method of claim 50 wherein the allowing step includes:
allowing the temperature of the wafer to rise to the range of about 130°C to about 300°C in the range of about sixty seconds to about 240 seconds by the reduction of the pressure of the gas.

52. The method of claim 50 wherein the controlling step includes:
allowing the temperature of the wafer to climb by reducing the pressure of a gas in contact with the backside of the wafer.

53. The method of claim 50 wherein the allowing step includes:
allowing the temperature of the wafer to rise to the range of about 130°C to about 300°C.

54. The method of claim 50 including;
etching a platinum feature on the wafer.

55. The method of claim 50 including;
using chlorine gas to etch the platinum feature on the wafer.

56. The method of claim 52 including;

1 using helium as the gas to control the temperature of the wafer.

1 57. The method of claim 50 wherein the allowing step includes:

2 allowing the wafer temperature to rise from about 225°C to about 250°C during the
3 period of about 60 seconds to about 150 seconds from the beginning of etch in order to cause
4 critical dimension growth to plateau.

1 58. The method of claim 50 wherein the etching is carried out in a low pressure etch
2 reactor which operates in the millitorr range and wherein a gas is contained in contact with the
3 chuck, which gas is in the range of about 0 torr to about 10 torr and is preferably about 1 torr.

1 59. A method for minimizing critical dimension growth of a feature located on a
2 wafer during an etch process including the steps of:

3 placing a wafer in a reactor;

4 controlling the transfer of heat from the wafer in order to allow the temperature of the
5 wafer to climb without applying heat to the wafer, in order to minimize the critical dimension
6 growth of the feature located on the wafer.

1 60. The method of claim 59 wherein:

2 said controlling step controls the transfer of heat from the wafer by controlling the
3 pressure of a gas maintained in contact with a backside of the wafer.

1 61. The method of claim 59 wherein:

2 said controlling step includes adjusting the degree of thermal insulation of the backside
3 of the wafer.

1 62. The method of claim 60 wherein:

1 said controlling step includes setting the pressure of the gas in the range of about 0
2 torr to about 10 torr.

1 63. The method of claim 59 wherein:
2 said controlling step includes setting the pressure of the gas at about 1 torr.


1 64. The method of claim 59 wherein the etch process is carried out in a low
2 pressure etch reactor which operates in the millitorr range and wherein a gas is contained in
3 contact with the chuck, which gas is in the range of about 0 torr to about 10 torr and is preferably
4 about 1 torr.

REMARKS

It is believed that all claims in the application should be patentable, and a Notice of Allowance is requested. The Commissioner is authorized to charge any underpayment or credit any overpayment to Deposit Account No. 06-1325 for any matter in connection with this Preliminary Amendment.

Respectfully submitted,

Date: June 13, 2001

By: 
Sheldon R. Meyer
Reg. No. 27,660

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In the Claims:

Cancel claim 1.

Add new claims 39-64, as set forth in the claim set below.

1 39. A method for minimizing critical dimension growth of a feature located on a
2 wafer during an etch process including the steps of:

3 placing a wafer on a chuck in an etch reactor;

4 etching a wafer in an etch reactor; and

5 controlling the amount of heat transferred from the wafer in order to allow the
6 temperature of the wafer to climb to the range of about 130°C to about 300°C, thereby
7 minimizing the critical dimension growth of the feature located on the wafer.

1 40. The method of claim 39 wherein the controlling step further includes:

2 heating the chuck in order to increase the temperature of the wafer.

1 41. The method of claim 39 wherein the controlling step further includes:

2 heating the chuck independently of controlling the heat transferred in order to heat the
3 wafer.

1 42. The method of claim 39 wherein the controlling step further includes:

2 using a heating source to heat the chuck independent of controlling the heat
3 transferred in order to increase the temperature of the wafer.

1 43. The method of claim 39 wherein the controlling step includes:

2 adjusting the pressure of a gas contained in contact principally only with the backside
3 of the wafer in order to increase the temperature of the wafer.

1 44. The method of claim 39 wherein the controlling step further includes:

2 using a heat source incorporated with the chuck to heat the wafer.

1 45. The method of claim 39 wherein the controlling step includes:

2 allowing the temperature of the wafer to rise to the range of about 130°C to about
3 300°C in the range of about 60 seconds to about 240 seconds.

1 46. The method of claim 43 wherein :

2 the adjusting step includes setting the pressure of the gas in the range of about zero
3 torr to about 10 torr.

1 47. The method of claim 43 wherein:

2 the adjusting step includes setting the pressure of the gas at about 1 torr.

1 48. The method of claim 39 wherein the controlling step includes:

2 allowing the wafer temperature to rise from about 225°C to about 250°C during the
3 period of about 60 seconds to about 150 seconds from the beginning of etch in order to cause
4 critical dimension growth to plateau.

1 49. The method of claim 39 wherein the etching is carried out in a low pressure

2 etch reactor which operates in the millitorr range and wherein a gas is contained in contact with
3 the chuck, which gas is in the range of about 0 torr to about 10 torr and is preferably about 1 torr.

1 50. A method for minimizing critical dimension growth of a feature located on a
2 wafer during an etch process including the steps of:

3 placing a wafer on a chuck in an etch reactor;

1 controlling the temperature of the wafer by controlling the amount of heat transferred
2 from the wafer;
3 etching a wafer in an etch reactor; and
4 allowing the temperature of the wafer to climb in order to minimize the critical
5 dimension growth of the feature located on the wafer by reducing the amount of heat transferred
6 from the wafer.

1 51. The method of claim 50 wherein the allowing step includes:
2 allowing the temperature of the wafer to rise to the range of about 130°C to about
3 300°C in the range of about sixty seconds to about 240 seconds by the reduction of the
4 pressure of the gas.

1 52. The method of claim 50 wherein the controlling step includes:
2 allowing the temperature of the wafer to climb by reducing the pressure of a gas in
3 contact with the backside of the wafer.

1 53. The method of claim 50 wherein the allowing step includes:
2 allowing the temperature of the wafer to rise to the range of about 130°C to about
3 300°C.

1 54. The method of claim 50 including;
2 etching a platinum feature on the wafer.

1 55. The method of claim 50 including:
2 using chlorine gas to etch the platinum feature on the wafer.

1 56. The method of claim 52 including:

1 using helium as the gas to control the temperature of the wafer.

1 57. The method of claim 50 wherein the allowing step includes:

2 allowing the wafer temperature to rise from about 225°C to about 250°C during the
3 period of about 60 seconds to about 150 seconds from the beginning of etch in order to cause
4 critical dimension growth to plateau.

1 58. The method of claim 50 wherein the etching is carried out in a low pressure etch
2 reactor which operates in the millitorr range and wherein a gas is contained in contact with the
3 chuck, which gas is in the range of about 0 torr to about 10 torr and is preferably about 1 torr.

1 59. A method for minimizing critical dimension growth of a feature located on a
2 wafer during an etch process including the steps of:

3 placing a wafer in a reactor;

4 controlling the transfer of heat from the wafer in order to allow the temperature of the
5 wafer to climb without applying heat to the wafer, in order to minimize the critical dimension
6 growth of the feature located on the wafer.

1 60. The method of claim 59 wherein:

2 said controlling step controls the transfer of heat from the wafer by controlling the
3 pressure of a gas maintained in contact with a backside of the wafer.

1 61. The method of claim 59 wherein:

2 said controlling step includes adjusting the degree of thermal insulation of the backside
3 of the wafer.

1 62. The method of claim 60 wherein:

1 said controlling step includes setting the pressure of the gas in the range of about 0
2 torr to about 10 torr.

1 63. The method of claim 59 wherein:

2 said controlling step includes setting the pressure of the gas at about 1 torr.


1 64. The method of claim 59 wherein the etch process is carried out in a low
2 pressure etch reactor which operates in the millitorr range and wherein a gas is contained in
3 contact with the chuck, which gas is in the range of about 0 torr to about 10 torr and is preferably
4 about 1 torr.

REMARKS

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